# HARD DISK MODULE MOUNTING STRUCTURE FOR NOTEBOOK COMPUTER

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention:

The present invention relates to a hard disk module mounting structure for notebook computer and, more particularly, to such a hard disk module mounting structure, which enables the e hard disk module to be conveniently detachably installed in one receiving chamber inside the mainframe shell of a notebook computer.

### 2. Description of the Related Art:

The modern world we live has entered a new era of high development of information technology. A variety of microprocessor based information products have been continuously developed to serve people. These information products have become a part of our life. Following fast development of information technology, people do more care about the quality of information products, more particularly, notebook computers. It has become one of the indexes to measure the level of the information product manufacturing technology of a country by means of evaluating the convenience and efficiency of the services of notebook computers the country supplied.

The market tendency of mainframe shells for notebook computer is towards a lighter, thinner, shorter, and smaller design. This concept t forces component parts suppliers to develop their products towards miniaturization. There is little difference between microprocessors for notebook computer and microprocessors for desk computer. However, there is a significant difference in

performance between a hard disk for notebook computer and a hard disk for desk computer.

Why the performance of a hard disk for notebook computer is inferior to a hard disk for desk computer? The main reason comes from the miniaturization of component parts. In order to perform this design concept, certain hard disk features (for example, data storage capacity or data access speed) are sacrificed. More particularly, after the commercialization of Windows operation system, the impact of the performance of hard disk to the whole computer system is enhanced. Because Windows adopts virtual memory technology, hard disk needs to process swap file of virtual memory. Therefore, the mission of hard disk is not limited to starting system files/programs or reading user's files. This is a thorny problem to manufacturers of hard disks for notebook computer. It is a bottleneck to people in information industry to improve the performance of hard disk for notebook computer. The improvement of the performance of hard disk for notebook computer has become an important index to evaluate the manufacturing technique of a company.

From the aforesaid detailed instruction of hard disk for notebook computer, we understood the existence of problems in miniaturization of notebook computer. Every hard disk supplier has been trying hard to develop smaller, thinner, lighter, and shorter hard disks with higher capacity and access speed to satisfy market demands. However, there are problems during exchange between new generation hard disks and old generation hard disks. These problems are discussed hereinafter.

When installing a hard disk module **2** in a notebook computer's mainframe shell **1**, as shown in FIG. 1, the mainframe shell **1** has a receiving chamber **10** and a connector **11** inside the receiving chamber **10**, and the hard disk module **2** has an I/O port **20** at one end. When put the hard disk module **2** in the receiving chamber **10**, the

hard disk module **2** is pushed forwards to force the I/O port **20** into engagement with the connector **11**. This connection is not safe. When the notebook computer vibrated or struck by an external body, the I/O port **20** may be forced away from the connector **11**, and the user may have to deliver the notebook computer to the distributor or service center for examination if he (she) cannot find the reason of the failure.

In information market, the competition of notebook computer is severe. This severe competition gives much pressure to computer suppliers. However this market competition gives choices to consumers. Every consumer hopes to buy a humanized notebook computer at a reasonable price. Any humanized design of a notebook computer will help the supplier compete with others in the market. Therefore, it is desirable to provide a hard disk module mounting structure that enables the user to rapidly and firmly fasten the hard disk module to the mainframe shell and then conveniently easily disconnect the hard disk module from the mainframe shell.

## SUMMARY OF THE INVENTION

The present invention has been accomplished under the circumstances in view. It is the main object of the present invention to provide a hard disk module mounting structure, which enables the hard disk module to be conveniently detachably installed in one receiving chamber inside the mainframe shell of a notebook computer.

According to the present invention, the hard disk module mounting structure is provided at one end of a hard disk module receivable in one receiving chamber of the mainframe shell of a notebook computer for fastening to the mainframe shell to secure the hard disk module to the inside of the receiving

chamber after connection of an I/O port of the hard disk module to a connector inside the receiving chamber. The hard disk module mounting structure comprises two brackets respectively fixedly fastened to two opposite lateral sidewalls of said hard disk module near one end remote from said I/O port; a mounting bar pivotally connected between said brackets; and at least one lug fixedly extended from one side of said mounting bar for fastening to said receiving chamber.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing the installation of a hard disk module in one receiving chamber inside a mainframe shell for notebook computer according to the prior art.

FIG. 2 is a perspective view showing the installation of a hard disk module in one receiving chamber inside a mainframe shell for notebook computer according to the present invention.

FIG. 3 is an elevational view of a hard disk module mounting structure according to the present invention.

FIG. 4A is a schematic sectional view showing the action of the present invention (I).

FIG. 4B is a schematic sectional view showing the action of the present invention (II).

FIG. 4C is a schematic sectional view showing the action of the present invention (III).

FIG. 5 is a perspective view showing the installation of an alternate form of the hard disk module in one receiving chamber inside a mainframe shell for notebook computer according to the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 2, the mainframe shell **1**, referenced by the mainframe shell **1**, has at least one receiving chamber **10** adapted to accommodate a respective hard disk module **2**, a connector **11** disposed in each receiving chamber **10** and electrically coupled to the motherboard inside the mainframe shell **1**. When a hard disk module **2** installed in one receiving chamber **10**, the I/O port **20** of the hard disk module **2** is connected to the connector **11** in the receiving chamber **10**, and therefore the hard disk module **2** is electrically connected to the motherboard inside the mainframe shell **1**. The hard disk module **2** is provided with a mounting structure **3** disposed at one end opposite to the I/O port **20** for fastening to the receiving chamber **10**. When unfastened the mounting structure **3**, the hard disk module **2** can then be pushed away from the connector **11** and taken out of the receiving chamber **10**.

Referring to FIG. 3 and FIG. 2 again, the mounting structure **3** comprises a mounting bar **30**, and two brackets **32** respectively pivoted to the two distal ends of the mounting bar **30**. The mounting bar **30** has at least one lug **31** at each of the two ends. The brackets **32** are respectively affixed to the two opposite lateral sidewalls of the hard disk module **2** near one end opposite to the I/O port **20**. After installation of the mounting structure **3** in the hard disk module **2**, the mounting bar **30** can be turned about the axis passing through the pivot points between the mounting bar **30** and the brackets **32**.

Referring to FIGS. 4A~4C and FIGS. 2 and 3 again, because the brackets **32** are affixed to the hard disk module **2**, the mounting bar **30** can be turned relative to the hard disk module **2** to the desired angle after connection of the I/O port **20** of the hard disk module **2** to the connector **11** in the receiving chamber **10** inside the

mainframe shell **1**, for enabling the lugs **31** to be affixed to the receiving chamber **10**. Thus, as shown in FIG. 4A, the two ends of the hard disk module **2** are respectively secured to the receiving chamber **10** by the I/O port **20** and the mounting structure **3**. When disconnecting the lugs **31** from the mainframe shell **1**, as shown in FIG. 4B, the mounting bar **30** can be turned to a particular angle, for enabling the hard disk module **2** to be pushed in direction away from the connector **11** to disconnect the I/O port **20** from the connector **11**, as shown in FIG. 4C. After disconnection of the I/O port **20** from the connector **11**, the two ends of the hard disk module **2** are released from the receiving chamber **10**, and the user can then easily remove the hard disk module **2** from the receiving chamber **10**.

Referring to FIG. 2 and FIG. 5 again, the two brackets **32** each have a mounting hole **33**. The hard disk module **2** has two screw holes (not shown) at two sides corresponding to the mounting holes **33** of the brackets **32**. Fastening members, for example, screws **4** are respectively mounted in the mounting holes **33** of the brackets **32** and threaded into the screw holes of the hard disk module **2** to fixedly secure the brackets **32** to the hard disk module **2**.

Referring to FIG. 2 and FIG. 5 again, each lug **31** of the mounting bar **30** has a mounting hole **34**. The receiving chamber **10** has a plurality of screw holes (not shown) corresponding to the mounting holes **34** of the lugs **31** of the mounting bar **30**. Fastening members, for example, screws **5** are respectively mounted in the mounting holes **34** of the lugs **31** and threaded into the screw holes of the receiving chamber **10** to affix the mounting structure **3** to the receiving chamber **10** inside the mainframe shell **1**.

Referring to FIG. 4A again, the receiving chamber **10** of the mainframe shell **1** is covered with a cover **7**. The cover **7** has at least one retaining block **70**.

When closing the cover **7** on the receiving chamber **10**, each retaining block **70** is respectively forced into engagement with a respective recessed portion at the mounting bar **30** to hold down the hard disk module **2** in the receiving chamber **10**. Further, the cover **7** has spongy means, for example, a sponge **71** disposed at an inner side. When the cover **7** installed in the mainframe shell **1**, the sponge **71** is pressed on the hard disk module **2** to hold down the hard disk module **2** in the receiving chamber **10**.

Referring to FIG. 5, two stop means, for example, stop rods **8** are symmetrically bilaterally provided inside the receiving chamber **10** remote from the connector **11**. When turning the mounting bar **30** upwardly backwards to a certain position after disconnection of the lugs **31** from the mainframe shell **1**, the mounting bar **30** will be stopped against the stop rods **8** to produce a resisting force that pushes the hard disk module **2** in direction away from the connector **11**, thereby causing the I/O port **20** to be disconnected from the connector **11**.

Referring to FIG. 5 again, the mounting bar **30** is provided with a handle **9** through which the user can turn the mounting bar **30** with the hand conveniently.

A prototype of hard disk module mounting structure for notebook computer has been constructed with the features of FIGS. 2~5. The hard disk module mounting structure for notebook computer functions smoothly to provide all of the features discussed earlier.

Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.